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ABSTRACT

This discussion of the use of distance education for deaf students argues that distance education methodologies appear to be relatively attractive to the hearing impaired student because they rely to a substantial extent upon the written word and visual transmission of information. Several projects that use computer or interactive systems to teach language to deaf students are discussed, and it is noted that deaf students seem to interact well with a computerized system, in particular because they feel that working at a terminal is an "adult" task which maintains their interest. It is suggested that distance education systems for the deaf should be developed with interactive capabilities so that these students are not isolated from their teachers or other students. An example of such a system is described--the British Open University's CYCLOPS system, which is a distance telewriting system that permits the tutor to generate visual information and transmit over telephone lines, with student response via a light pen on the screen. Computer conferencing systems are also cited as types of systems that would enable such interaction for hearing impaired students. (EW)

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EDUCATIONAL TECHNOLOGY IN DISTANT LEARNING (FOR THE DEAF)

Paper presented to the European Conference on Technology and Communication Impairment

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GERALD HALES - 1985

In almost every aspect of life, the twentieth century has seen rapid and fundamental development. At the beginning of this century, travel on land was still mostly by horse, travel on the sea was mostly by sail, travel in the air was unknown and communication at a distance was a technique only just beginning to exercise men's minds. By the end of this same century all these things will have changed out of all recognition. However, major changes in the century are not restricted solely to methods of communication, although it is perhaps here that the differences are particularly stark. There have also been major changes in the field of education, especially in terms of our belief and understanding of what "actually is" Education.

In the days of the earliest Education Acts, at the end of the last century, education was largely perceived as a one way process. Those who had information and knowledge were required to transmit it to those who did not, and the job of the student was to acquire and

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remember that knowledge as best he could. Now our understanding of education has broadened and expanded to a remarkable degree, so that we understand it to be a life-long process in many fields, involving experience, understanding and development as well as knowledge and learning.

The two aspects of change I have mentioned, those of communication and education, are by no means entirely separate. In the last few years, advances in communication techniques have enabled us to pursue changes in education, and advances in education technology have made it possible to develop methods of education which differ from the traditional format. The most obvious and widespread of these is what has come to be known as "Distance Education."

The advantages of distance education are wide-ranging: obviously in the first place it caters for the student who is not able physically to attend a centre of learning, either because of distance to travel, or because he has a job to hold down, or a family to run during the larger part of the waking hours. Many are in this position because of opporunities missed or chances not taken in years gone by. However, there is another substantial group of people who may be in a position of needing education by distance techniques later in their lives than is the norm, because of an inability to participate in normal educational systems, either currently or in the past. This group encompasses all those students who have a handicap. This may be an intrinsic handicap, such as the problems of deafness, blindness or speech impairment, or an extrinsic handicap such great distance or isolation. Indeed, the potential solutions for these two groups of students are not entirely dissimilar, for the University of the South Pacific has grown up to serve students on a multitude of little islands and to make provision for them by distance education techniques, with an opportunity of gaining knowledge and qualifications from which otherwise they would be entirely severed.

Indeed, this situation in many ways mirrors precisely the experience of handicapped students, particularly the deaf, the group we are considering today. People with impaired hearing, or no hearing, are

cut off from many of the avenues of education commonly available to other students, and in this respect their handicap is compounded. If they were hearing impaired when younger, then their degree of access to education has already been poor in years gone by, meaning that they have probably come to the concept of distance education with an educational deficit as well as a communication problem.

In many ways, the principles of many of the methodologies of distance education appear to be relatively attractive for the hearing impaired student. This is because a great number of them rely to a fairly substantial extent upon the printed word, and transmission is by post. Such material is, of course, visual and therefore very attractive to the person who relies on a visual channel of communication. However, this solution is not entirely as easy as it may seem, for the deaf student may well have accumulated considerable language deficits during his years in conventional education, and will be far less capable than many other students of handling the visual/linguistic channel with facility. Many other factors are also affected by the hearing impairment, including such things as the individual's degree and quality of socialisation, and the way in which he interacts with the world and the people around him.

There are a number of projects in hand now which have turned their attention to using technology to support the teaching of language to the deaf, whether it be to deaf children learning language or to older people needing to improve or remediate the deficits in the language they already have. Thus there is work at Hull University, for instance, using an interactive instruction system for deaf children based on their own experience, using photographs or slides of their own work as the starting point for building up sentences based on their activities. The child's task is to make sentences from the words provided by the computer about these activities, and he is able to manipulate words around the display screen to achieve his final sentence. Not only is there visual reinforcement on the screen, but also reinforcement in the child's memory as the words relate directly to activities that he understands. However, language acquisition is a slow process, and when hampered by the additional burden of a hearing impairment may well involve a time-scale makes adequate progress virtualy impossible.

Many people have been aware of this, and "Project Video Language" in San Diego, California, has considered "the need to accelerate the language acquisition in hearing impaired children". This recognised that many of the tasks involved in learning language, particularly for the hearing impaired, are very repetitive and dull, and therefore was designed to make these aspects of language learning more exciting.

The method uses a series of fundamental syntactical patterns, with sentences that illustrate each pattern in every possible transformation; these patterns are made real by video tapes and other material under the direct control of the teacher, using the "Appletree" language curriculum. One of the interesting factors here is that teachers state that they have found a very high level of interest among the pupils.

Many of these systems were designed for use with hearing impaired children in conventional educational settings, but equally many of them can be adapted for use by the lone student particularly if he is more mature. One report from America described work to overcome a difficulty in motivation among older deaf students. This introduced work based on the computer, including a good deal of repetitious practice programs on several levels. The introduction of the computer has led to much less frustration in both students and tutor, and an improvement in the quality of their language work. A useful point here is the report that "because the work is done at computer terminals, the students feel that they are doing an adult task and do not lose interest".

As the technology becomes more complex and more flexible, so it is more possible to relate use of the technology to real life, and this has particularly been useful in the combination of microcomputer and video disc. In Nebraska, for instance, there is work aimed at encouraging positive logical problem solving behaviour, leading students through a structured and guided "exploration of the decision-making process". This project is specifically designed to help develop skills of independent thinking in hearing impaired students of more than childhood age ranges.

Of course, this is only one aspect of the problem, concerned with the student trying to remediate skills that he needs for further learning; and, of course, this necessity is extant whether the student is learning at a distance or face to face. The problems of transmission of teaching and learning over a distance creates difficulties of its own, particularly for the hearing impaired student. Of course it is obvious that some of this is concerned with the reception of information, but one of the aspects of student life frequently missing for the hearing impaired person is the ability to have a two-way communication with staff members, asking questions, querying points and gaining and understanding answers. There is also the loss in not being able to converse with other students, which is not always of secondary importance.

The development of distance transmission of education in both visual as well as auditory modes has led to developments which could be of particular use to those with a hearing difficulty. One such is the CYCLOPS system pioneered and researched in The Open University, in conjunction with British Telecom. This is a distance telewriting system which provides the ability for a tutor to generate visual information and transmit over telephone lines to a receiving end where the student may see what is produced. This need not only be on a one-to-one situation, either, and by using conference telephone calls a number of students may be linked up. The terminals are fairly sophisticated, and are provided with a light pen enabling the student not only to see print and diagrams drawn on the screen, but also to respond in like manner, and clearly this has a good deal of use for the hearing impaired student participating in communication sessions.

The system is also designed to be versatile, acting as a viewdata terminal, a medium resolution graphics terminal and an audiovisual display. The pictures, and where necessary the sound track, may be recorded on a standard stereo tape, giving the facility for pictures to be replayed from an audio cassette player fitted to the terminal, which has cost implications when compared with systems that use video tapes. Thus it is possible for a tutor to use a standard, perhaps complex, diagram drawn accurately and stored on cassette, and after it has been transmitted to the student end of the system everyone is able to write on it or amend it or generally alter it in the process of the tutorial.

Used within the United Kingdom, of course, such a system uses hardware such as telephone lines, but there is no reason in principle why other distance communication systems cannot be used such as radio or microwave links.

Another step which may well benefit the deaf student in distance education is the development of computer conferencing as a new step from telephone conferencing. This is effectively a version of time-sharing computers, where instead of users working on isolated tasks, groups of them work together on common tasks. The point here is that the groups need not be geographically close; indeed individuals could be spread at any distance. The advantage of such a system for the deaf is that individuals will communicate with each other via keyboard terminals linked to the computer with communication taking place in typed visual messages. The point about such a system is that individuals need not only limit themselves to communicating with each other but may also interact with the computer and the system, even though they may be using the whole system at different times. All the students in a group working on the same problem do not necessarily have to be working at the same time, which is particularly important for students involved in distance education because they have other work and family commitments at various times. Such a system also carries the possibility of electronic mail, which is clearly particularly useful to those who find difficulty in using an auditory-based communication system. Such systems also allow the student to proceed at his own pace, thinking in his own way, and it does not take

a great deal of thought to realise that there may be many advantages for the hearing impaired individual here.

Indeed, the wider use of computers in many areas could well have beneficial spin-off for the handicapped student. For example, much typesetting of text is now handled by computer (as is the case in the Open University). Thus it would not be difficult to conceive of a system by which a student, via his Viewdata terminal, can access a given page of a particular text for a specific course, and have it transmitted to him in any form he chooses - vision, print, sound, large print, braille, etc.

At the beginning of this paper, I referred to the speed and breadth of developments during the twentieth century. One of the most far reaching of these has been the development of telecommunications, still exemplified in most of our lives by the ordinary telephone. Many of you will know that the original conception was developed by Alexander Graham Bell not as a distance communication device, but as an aid for poor hearing for his sister. It is thus somewhat ironic that the very group of people who have been largely excluded from telephones are those representing the person for whom the idea was originally conceived! However, as technology develops and the availability, flexibility and portability of computers in their many guises improves, we see an increasing ability to make use of the visual aspect of the new technology, and clearly this begins once again to bring the advantages of distance telecommunication within the realm of those who find listening a problem.

Therefore, we begin to see the development of technological methodologies both to correct and improve the language problems of those who have hearing impairments, to replace and support the educational deficits which are often the lot of those with a hearing impairment, and to facilitate at long last the ability to participate for those with a hearing impairment. Thus the development of this sort of technology within distance education will produce, and is producing, not only hearing impaired people who are better educated and higher qualified, but are more able to take part in all the many aspects of life which are so important for their personal, social and occupational development.